The ISS-2

The Inspection Selection System (ISS) is a decision-aid for commercial vehicle roadside driver/vehicle safety inspections which guides safety inspectors in selecting vehicles for inspection. The ISS-2 provides a three tiered recommendation as follows:

Recommendation	ISS-2 Inspection Value
Inspect (inspection warranted)	75-100
Optional (may be worth a look)	50-74
Pass (no inspection required)	1-49

The underlying inspection value is based on data analysis of the motor carrier's safety performance record using the myriad of information in the National Motor Carrier Management Information System (MCMIS). This **safety algorithm** for assigning the inspection value is described in the next pages. It is based on SafeStat which essentially ranks all carriers by their safety performance in areas of crash history, inspection history, driver history, and safety management experience. A full description of SafeStat can be found in:

> SafeStat, Motor Carrier Safety Status Measurement System, Methodology: Version 8.2, April 2001, FMCSA, U.S. Dept of Transportation. (http://ai.volpe.dot.gov/safestat/safestat.asp?file=method.pdf)

In the case of motor carriers for which there is little information on file, the ISS-2 determines the inspection value by weighing the carrier size and number of past inspections. This is called the **insufficient data algorithm** and is also explained in detail in the following pages. The underlying concept is to encourage inspections when there is little carrier history or past inspections. As the inspection data increases, the inspection value decreases and eventually the carrier will move into SafeStat and be monitored via safety performance as described above.

In ISS-2, all carriers have an inspection value. When the inspection value is displayed, there is an accompanying message that states whether the inspection value is based on SafeStat data or lack of safety performance data.

As a system, ISS-2 also provides a great deal of current carrier specific information which is easily accessed by DOT number, ICC number, or carrier legal name. ISS-2 can also work with intrastate carriers when states supply carrier data.

For a detailed analysis of the statistical success of ISS-2 in optimizing inspection resources and maximizing the risk reduction potential of roadside inspections, see:

> ISS-2: The Integration of the Motor Carrier Safety Status measurement System (SafeStat) into the Roadside Inspection Selection System (ISS), January 2000, Upper Great Plains Transportation Institute, North Dakota State University. (http://www.ugpti.org/motorcarrier/ISS2rpt.pdf)

The Safety ISS-2 Algorithm

The **Safety Algorithm** for ISS-2 is calculated as follows:

(1) If a carrier has been identified for monitoring in the PRISM[1] program, it automatically receives a Safety ISS-2 value of 100.

(2) The remaining carriers are placed in categories and groups based on their score in each Safety Evaluation Area (SEA) similar to those used by SafeStat (see Table 1). Note that the groups use the carrier's *applicable highest* SEA values.

(3) Within each group 1 through 11 and 16 through 26, the carrier's SEA indicators are summed placing 2 times as much weight on the Accident SEA and 1.5 times as much weight on the Driver SEA if applicable.

(4) For groups 12, 13, 14, 15, 28, 29, 30, 43, 44, and 45, the "sum" is simply the SEA value (the only one applicable).

(5) For groups 27 and 42 (with an Accident SEA value <75 AND no other value in any other SEA), they are placed in category I (with group 46)

(6) For groups 31 through 41, use the *maximum* of the Accident, Driver, Vehicle, and/or Safety Management SEA (for example, if a carrier received a Driver SEA of 49, a Vehicle SEA of 35, and an Accident SEA of 20, use the value 49 as the "sum").

(7) Starting with category A, all carriers are ranked based on their sum, then go to category B continuing the ranking, ... down through category F.

Note that these rankings (for categories A through F) are then assigned percentile ranks from 75 to 100.

(8) The remaining G and H categories are combined and ranked all together. However, category G (group 15) carriers should be ranked higher than all category H carriers.

Note that these rankings (for categories G and H) are then assigned percentile ranks from 1 to 74.

These percentile ranks (for all categories) then become the Safety ISS-2 inspection value.

[1]The Performance and Registration Information Systems Management program. See www.fmcsa.dot.gov/factsfigs/Prism.htm for a description.

Table 1. Groups and ISS-2 Value Range

Category	Group	SEA Values	Number of Carriers (4/01)	ISS-2 Value Range
		Carrier is being monitored in PRISM	1,078	100
A	1	Acc$75, Drv$75, Veh$75, Saf$75	63	100
SafeStat score:	2	Acc$75, Drv$75, Veh$75	119	100
$ 350 to # 550	3	Acc$75, Drv$75, Saf$75	122	100
	4	Acc$75, Veh$75, Saf$75	52	99-100
B	5	Drv$75, Veh$75, Saf$75	769	99-100
SafeStat score:	6	Acc$75, Drv$75	382	99-100
$ 225 to < 350	7	Acc$75, Veh$75	353	97-99
	8	Acc$75, Saf$75	67	98-99
B or C	9	Drv$75, Veh$75	2,692	96-99
B or C	10	Drv$75, Saf$75	1,147	96-99
C SafeStat score: $ 150 to < 225	11	Veh$75, Saf$75	584	95-96
D	12	Acc$75	2,422	94-95
E	13	Drv$75	10,418	87-94
F	14	Veh$75	17,901	75-87
G	15	Saf$75	1,887	73-74

(continued)

Table 1. Groups and ISS-2 Value Range (continued)

Category	Group	SEA Values	Number of Carriers (4/01)	ISS-2 Value Range
H	16	50#Acc<75, 50#Drv<75, 50#Veh<75, 50#Saf<75	79	73
	17	50#Acc<75, 50#Drv<75, 50#Veh<75	661	72-73
	18	50#Acc<75, 50#Drv<75, 50#Saf<75	121	72-73
	19	50#Acc<75, 50#Veh<75, 50#Saf<75	64	71-72
	20	50#Drv<75, 50#Veh<75, 50#Saf<75	442	68-72
	21	50#Acc<75, 50#Drv<75	1,209	67-72
	22	50#Acc<75, 50#Veh<75	1,156	63-72
	23	50#Acc<75, 50#Saf<75	133	63-72
	24	50#Drv<75, 50#Veh<75	12,350	62-71
	25	50#Drv<75, 50#Saf<75	627	62-71
	26	50#Veh<75, 50#Saf<75	533	62-63
	28	50#Drv<75	20,944	31-62
	29	50#Veh<75	25,003	31-62
	30	50#Saf<75	1,483	33-62
	31	0<Acc<75, 0#Drv<50, 0#Veh<50, 0#Saf<50	37	19-62
	32	0<Acc<75, 0#Drv<50, 0#Veh<50	8,260	19-62
	33	0<Acc<75, 0#Drv<50, 0#Saf<50	0	-
	34	0<Acc<75, 0#Veh<50, 0#Saf<50	0	-
	35	0#Drv<50, 0#Veh<50, 0#Saf<50	96	10-31
	36	0<Acc<75, 0#Drv<50	891	19-62
	37	0<Acc<75, 0#Veh<50	56	19-47
	38	0<Acc<75, 0#Saf<50	0	-
	39	0#Drv<50, 0#Veh<50	31,735	10-31
	40	0#Drv<50, 0#Saf<50	0	-
	41	0#Veh<50, 0#Saf<50	0	-
	43	0#Drv<50	10,006	10-22
	44	0#Veh<50	580	10-31
	45	0#Saf<50	0	-
Total			**156,522**	
I	27	50#Acc<75 AND no SEA value in any other SEA		50-100
	42	0#Acc<50 AND no SEA value in any other SEA		50-100
	46	No SEA value in any SEA		50-100

The ISS-2 Insufficient Data Algorithm

The **Insufficient Data** Algorithm for ISS-2 is calculated as follows:

Only if a carrier does not receive a score from the Safety Algorithm (Category I):

All data is based on the past 30 months.

Case 1: *If a carrier has zero (0) roadside inspections (Level I, II, III, or V),* assign an ISS-2 value based only on their size as follows:

Category				**ISS-2 Value**
1001+ power units	OR	1001+ drivers	=	100
201-1000 power units	OR	201-1000 drivers	=	99
64-200 power units	OR	72-200 drivers	=	98
16-63 power units	OR	16-71 drivers	=	97
7-15 power units	OR	6-15 drivers	=	96
2-6 power units	OR	2-5 drivers	=	95
1 power unit	OR	1 driver	=	94

(1) Assign the carrier the *higher* of their values. For example, if a carrier has 75 power units (ISS-2 value=98) and 50 drivers (ISS-2 value=97), they would receive a final ISS-2 value of 98.

(2) *If there is no power unit information nor driver information*, simply assign them the midpoint ISS-2 value of 97.

Case 2: *For carriers with one or more previous roadside inspections,* determine their Inspection per Power Unit Rate, their Inspection per Driver Rate, and subsequent Inspection Average Rate as follows and rank from 50-100.

(1) The Inspection per Power Unit Rate is determined by dividing the number of Level 1, 2 and 5 inspections the carrier has had in the previous 30 months by the number of power units they indicate.

(2) The Inspection per Driver Rate is determined by dividing the number of Level 1, 2, and 3 inspections the carrier has had in the previous 30 months by the number of drivers they indicate.

(3) The **Inspection Average Rate** is then the average of these two rates (the Inspection per Power Unit Rate and the Inspection per Driver Rate). *If one of the rates is unable to be determined (because of no power unit or driver information), the Inspection Average Rate is simply the rate which can be determined.*

(4) Using these Inspection Average Rates, a ranking of 50 to 100 is assigned to the carriers (the *lowest* Inspection Average Rates should get the highest rankings), which then becomes these carriers' ISS-2 values.

- If there is no size information available to calculate the Inspection Average Rate (but, the carrier does have at least one inspection), the ISS-2 value is simply the arbitrary value, 92.

Thus, ALL carriers in MCMIS have a Safety ISS-2 value OR an Insufficient Data ISS-2 value.